(**Adopted:** 10/28/96)

RULE 1118
Aerospace Vehicle Parts and Products Coating Operations

(A) General

(1) Purpose.

(a) The purpose of this rule is to reduce the amount of emissions of volatile organic compounds (VOCs) from the source category of aerospace vehicle manufacturing or reworking facility and to provide the administrative requirements for measuring and recording the VOC emissions from adhesives, coatings and cleaning solvents used by such facilities.

(2) Applicability.

(a) This rule is applicable to any person who manufactures or reworks aerospace vehicles by applying or specifying the use of surface coatings for aerospace vehicle parts and products.

(B) Definitions

For purposes of this Rule, the following definitions shall apply:

(1) "Adhesive" - any substance that is used to bond one surface to another by attachment.

(2) "Adhesive Bonding Primer" - any coating applied in a very thin film to aircraft or aerospace parts or products for the primary purpose of providing a primer for a subsequent coat of structural adhesive.

(3) "Aerosol Coating Product" - any coating product containing pigments or resins that are dispensed by means of a propellant, and is packaged in a disposable, pressurized can for hand-held application.

(4) "Aerospace Vehicle" - any fabricated part, assembly of parts or completed unit of any aircraft, helicopter, missile, and space vehicles, including such integral equipment as models, mockups, prototypes, molds, jigs, tooling, hardware jackets, test coupons and any auxiliary equipment associated with testing, transport, and storage of such vehicles.

(5) "Air Pollution Control Officer (APCO)" - The person appointed to the position of Air Pollution Control Officer of the District pursuant to the provisions of California Health & Safety Code 40750, and his or her designee.

(6) "Chemical Agent Resistant Coating (CARC)" - any exterior topcoat designed to withstand exposure to chemical and biological warfare agents or the decontaminents used on these agents.

(7) "Chemical Milling - Type I Etchant" - the removal of metal by chemical action of acids or alkalies. Type I etchants contain varying amounts of dissolved sulfur and do not contain amines.

(8) "Chemical Milling - Type II Etchant" - the removal of aluminum by chemical action of a strong sodium hydroxide solution containing amines. This does not include chemical milling processes utilizing bonding maskants, line sealers, critical use and seal coat maskants.

(9) "Chemical Processing" - any process, other than coating or chemical milling, which provides protection to the surface of a product such as, but not limited to, anodizing, aging, bonding, plating, etching and/or performing other chemical operations on the surface of the part.

(10) "Compliance Assurance Monitoring" - the combined total equipment, mechanism(s), and /or technique(s) used to demonstrate and insure compliance with the control device efficiency requirements stipulated in subsection (C)( ) of this Rule. Such monitoring is used to analyze and/or provide a permanent record of process parameters, such as temperatures, pressures, and flow rates.

(11) "Detailing or Touch-up Guns" - any small air spray equipment, including air brushes, that operate at no greater than 5 CFM air flow and no greater than 50 pounds per square inch gauge (Psig) air pressure and are used to coat small products or portions of products.

(12) "District" - The Mojave Desert Air Pollution Control District (MDAQMD), the geographical area of which is described in District Rule 103.

(13) "Electric/Radiation Effect Coatings" - any electrically conductive or insulative coating, or coatings used on radar and antennae enclosures.

(14) "Electrostatic Application" - any equipment which causes atomized paint droplets to be electrostatically charged for the purpose of causing the coating to be deposited onto the intended surface by electrostatic attraction. This application requires a minimum 60kV power supply.

(15) "Exempt Compounds" - those Group I and Group II compounds listed as non-photochemically reactive in 40 CFR 51.100(s).

(16) "Exterior Topcoat" - any topcoat which is not an interior habitable space topcoat.

(17) "Extreme Performance Interior Topcoat" - any topcoat used in interior spaces of aircraft areas requiring a fluid, stain or nicotine barrier.

(18) "Extreme Performance Coating" - any coating used on a metal surface where the coated surface is, in its intended use, exposed to any of the following:

(a) Industrial-grade detergents, cleaners, or abrasive scouring agents;

(b) Frequent or chronic exposure to salt water, corrosives, caustics, acids, oxidizing agents, chemicals, chemical fumes, chemical mixtures or solution; or

(c) Other similar environmental conditions as determined in writing by the District's APCO.

(19) "Facility" - all buildings, equipment and materials on one contiguous piece of property.

(20) "Fire-Resistant Coating" - any cabin interior coating that meets the Federal Aviation Administration-required Ohio State University Heat Release, Fire and Burn Tests specifications for civilian aircraft; or the Aircraft Structure Integrity Program (MIL-STD-1530A and MIL-A-87221 (Northrop's MS-445-3.3.2.2)) requirements for military aircraft.

(21) "Fuel Tank Coating" - any coating applied to the interior of a fuel tank or to fuel wetted areas of aircraft to protect it from corrosion.

(22) "General Coating Product" - any coating used on an aerospace vehicle which is not, as a category of products, specified in subsection (C)(1)(a) or (C)(1)(b) of this rule.

(23) "Grams of VOC per Liter of Coating Less Water and Less Exempt Compounds (VOC content)" - the weight of volatile organic compounds (VOC) per combined volume of VOCs and coating solids and can be calculated by the following equation:

$$\text{Grams (lb) of VOC/1(gal) of coating} = \frac{W_s - W_w - W_{es}}{V_m - V_w - V_{es}}$$

Where: W_s = Weight of volatile compounds (including water) in grams.
W_w = Weight of water in grams.
W_{es} = Weight of Exempt Compounds in grams.
V_m = Volume of material in liters.
V_w = Volume of water in liters.
V_{es} = Volume of Exempt Compounds in liters.

(24) "Hand Application Method" - the application of a surface coating, sealant or adhesive by manually held, non-mechanically operated equipment. Such equipment includes paint brush, hand-roller, trowel, spatula, dauber, rag or sponge.

(25) "High Temperature Coating" - any coating that, during normal use, must withstand temperatures in excess of 350°F.

(26) "High Volume Low Pressure (HVLP) Spraying" - any spray equipment with air pressure between 0.1 and 10.0 psi and air volume greater than 15.5 cfm per spray gun.

(27) "Interior Topcoat" - any topcoat used in habitable interior spaces of aircraft.

(28) "Maskant for Chemical Milling or Processing" - any coating applied directly to a part to protect surface areas when chemical milling, anodizing, aging, bonding, plating, etching and/or performing other chemical operations on the surface of the part.

(29) "Non-compliant Coating" - any coating which exceeds the VOC formulation limitations, as applied, of Subsections (C)(1)(a,b or c).

(30) "Nonstructural Adhesive" - any adhesive which bonds non-load-carrying aircraft components in non-structural applications.

(31) "Pretreatment Wash Primer" - any coating which contains no more than 12 % solids by weight, and at least .5% by weight of acid for surface etching and is applied directly to surfaces to provide corrosion resistance, adhesion and ease of stripping.

(32) "Primer" - any coating applied directly to a part for purposes of corrosion prevention, protection from the environment, functional fluid resistance and/or adhesion of subsequent coatings.

(33) "Rain Erosion Resistant Coating" - any coating that protects the leading edges. flaps, stabilizers, and engine inlet lips against erosion caused by rain impact during flight.

(34) "Rework" - the inspection, repair, and reconditioning of vehicles, their part and components subject to this rule.

(35) "Repair" - the recoating of previously coated product due to damage to the coating following normal painting operations.

(36) "Sealant" - any coating applied for the purpose of filling voids and providing a barrier against penetration of water, fuel or other fluids or vapors.

(37) "Sealant Bonding Primer" - any coating applied in a very thin film to a part or product for the purpose of providing a primer for a subsequent coat of silicone sealant.

(38) "Self Priming Topcoat" - any coating applied directly to a part or product that is not subsequently overcoated.

(39) "Space Vehicle" - any man-made device, either manned or unmanned, designed for operation beyond earth's atmosphere.

(40) "Stripper" - any precursor organic compound applied to remove temporary coating, maskant for chemical processing, paint or residue.

(41) "Structural Adhesive - Autoclavable" - any adhesive used to bond load-carrying aircraft components and is cured by heat and pressure in an autoclave.

(42) "Structural Adhesive - Non-autoclavable" - any adhesive cured under ambient conditions and is used to bond load-carrying aircraft components or other critical functions, such as nonstructural bonding in the proximity of engines.

(43) "Temporary Protective Coating" - any coating applied to a part to protect it from mechanical and environmental damage during manufacturing.

(44) "Topcoat" - any coating applied over primer, intermediary coating or unicoat for purposes such as appearance, identification or protection.

(45) "Touch up" - that portion of the coating operation which is separate from the main coating process but necessary to cover minor imperfections or to achieve coverage as required.

(46) "Transfer Efficiency" - the ratio of the weight of coating solids adhering to the object being coated to the weight of coating solids used in the application process, expressed as a percentage.

(47) "Unicoat" - any coating which is applied directly to an aerospace component for purposes of corrosion protection, environmental protection and functional fluid resistance, and that is not subsequently topcoated.

(48) "Volatile Organic Compound (VOC)" - any compound of carbon which may participate in such atmospheric photochemical reactions and contribute the formation of photochemical smog, excluding carbon monoxide, carbon dioxide, carbonic acid, metallic carbides or carbonates, ammonium carbonate and those exempt compounds listed in 40 CFR 51.100(S)(1).

(49) "Volume-weighted Average" - For those uncontrolled primers, topcoats and maskants that are averaged within their respective product category, the following equation shall be used to determine the monthly volume-weighted average mass of VOC emitted per volume of coating (less water and exempt compounds) as applied, subject to (E)(4)(b) daily record keeping.

$$G_a = \frac{\sum_{i-1}^{n} (VOC)_{ci} \; V_{ci}}{C_{lwes}}$$

Where

G_a	=	Volume weighted average mass of VOC per unit volume (lbs/gal) of coating (less water and exempt compounds) as applied, during each 30-day period.
n	=	number of coatings being averaged.
$(VOC)_{ci}$	=	VOC content (lbs/gal) of coating i (less water and exempt compounds) as applied for the coatings being averaged.
V_{ci}	=	Volume (gal) of coating i as applied for the coatings being averaged..
C_{lwes}	=	Total volume (gal) of all coatings (less water and exempt compounds) as applied for the coatings being averaged.

(50) "Wing Coating" - any corrosion-resistant coating that is resilient enough to withstand the flexing of the aircraft wings.

(C) Requirements

(1) VOC Limit Requirements

(a) A person shall not apply any coating or specify the use of any coating which, as applied, emits or may emit volatile organic compounds into the atmosphere in excess of the limits shown in the table below. These limits are expressed in Grams of VOC per Liter of Coating Less Water and Exempt Compounds (VOC content):

Coating Type	VOC Limit	
	g/l	lb/gal
Adhesive		
- Bonding Primer	250	2.1
- Non-structural adhesive	250	2.1
- Structural adhesive, autoclavable	50	0.4
- Structural adhesive, non-autoclavable	700	5.9
CARC	500	4.2
Electric/Radiation Effect	800	6.7
Extreme Performance		
- Coating	420	3.5
- Interior Topcoat	420	3.5
Fire-Resistant Coating		
- civilian	650	5.4
- military	970	7.7
Fuel Tank Coating	720	6.0
General Coating Product	350	2.9
High Temperature Coating	720	6.0
Interior Topcoat	340	2.8
Maskant for		
- Chemical Processing	600	5.0
- Chemical Milling, Type I Etchant	622	5.2
- Chemical Milling, Type II Etchant	160	1.3
Pretreatment Wash Primer	780	6.6
Primer	350	2.9
Rain Erosion Resistant Coating	600	5.0
Sealant	600	5.0
Sealant Bonding Primer	720	6.0

Coating Type	VOC Limit	
	g/l	lb/gal
Self Priming Topcoat	420	3.5
Space Vehicle Coating		
- Electrostatic-Discharge	800	6.7
- Other	1000	8.3
Temporary Protective Coating	250	2.1
Topcoat	420	3.5
Unicoat	420	3.5
Wing Coating	750	6.3

(b) Stripper: A person shall not apply any stripper or specify the use of any stripper unless it complies with one of the following:

(i) The stripper contains less than 400 grams/liter (3.3 lbs/gal) of VOC content; or
(ii) The stripper has a true vapor pressure of less than 10 mm Hg at actual usage temperature.

(c) Solvent Use and Clean Up: A person shall not use VOC-containing materials for cleaning or clean-up, excluding coating stripping equipment cleaning, unless:

(i) the VOC content composite partial pressure is 45 mm Hg or less at a temperature of 20 degrees C, or
(ii) the material contains 200 grams or less of VOC content per liter of material, as applied.

(d) Add-on Emissions Control Equipment - Sources may elect to use add-on emissions control equipment to achieve compliance with the provisions of Section (C)(1).

(i) The combined capture and control system efficiency must, at a minimum, be 85% effective in reducing VOC emissions.
(ii) Such control equipment must, prior to operation, be approved in advance by the Air Pollution Control Officer (APCO).
(iii) Any person choosing to install such control equipment shall obtain an Authority to Construct from the District prior to installation.

(2) Application Equipment Requirements

A person shall not apply coatings subject to the provisions of this rule except by using properly operated equipment and by:

(a) Electrostatic application, or

(b) Flow coat application, or

(c) Dip coat application, or

(d) High volume, low pressure spraying (HVLP), or

(e) Electrodeposition, or

(f) Hand application methods, or

(g) Detailing or touch-up guns, or

(h) Alternative Application Techniques - Alternative application techniques for coatings may be used when the alternative technique is demonstrated to have a transfer efficiency at least equal to one of the above methods, when used in such a manner that the parameters under which they were tested are permanent features of the application technique. Such alternative application techniques shall be approved in writing prior to use by the APCO.

(3) Closed Container Requirements

All VOC-containing materials, used or unused, including but not limited to surface coatings, thinners, cleanup solvents, or surface preparation materials shall be stored in closed containers and opened only during extraction or introduction of material for mixing, use or storage.

(4) Labeling Requirements

(a) Each container of any coating, solvent or stripper subject to this rule shall display the date on which the contents were manufactured or a code indicating the date of manufacture. Each manufacturer of such coatings shall file with the District's APCO and the Executive Officer of the California Air Resources Board an explanation of each code.

(b) Each container of any coating, solvent or stripper subject to this rule shall have the VOC content displayed, either

(i) on the manufacturer's label. VOC content may be calculated using product formulation data, or may be determined using the test method in Section (F); or
(ii) on a product information sheet; or
(iii) on the product Material Safety Data Sheet (MSDS).

(c) Each container of any coating, solvent or stripper subject to this rule shall display the maximum VOC content of the coating, as applied. When thinning is recommended on the label for normal environmental and application conditions, the subsequent thinning shall not cause a coating, as applied, to exceed its applicable standard. This recommendation shall not apply to the thinning of coatings with water.

(D) Exemptions

(1) Any person or facility claiming to be exempt from Section (C) of this rule must comply with applicable Recordkeeping requirements of Section (E) of this rule so as to provide documentation for the claimed exempt status.

(2) Any person or facility claiming exempt status must make, in writing, a certified Statement of Compliance to the District at the same time as the annual permit review/renewal or by March 1 of each calendar year for facilities not required to have permits to operate by the District.

(3) The provisions of Section (C) shall not apply to any coatings with separate formulations used in volumes of less than 50 gallons in any calendar year, provided that the total volume of non-complying coatings used at a stationary source does not exceed 200 gallons annually. Coatings used for operations that are exempt per Sections (D)(4) and (D)(5) shall not be included in calculating the volume of coatings used under this exemption.

(4) The provisions of Section (C)(2). shall not apply to touch-up and repair.

(5) The provisions of this rule shall not apply to coatings supplied in hand-held aerosol containers.

(6) The provisions of Section (C)(1) shall not apply to the recoating of assembled aircraft at rework facilities if the original coatings formulations are used.

(7) The provisions of Section (C)(1) shall not apply to laboratories which apply coatings to test specimens for the purpose of research, development, quality control, and testing of production-related operations.

(8) The provisions of (C)(1) shall not apply to the use of airbrush application methods for stenciling, lettering or other identification markings when such markings cover less than 20 percent of the vehicle, part or product's exterior surface area.

(E) Recordkeeping and Compliance Testing

Persons subject to this rule shall comply with the following requirements.

(1) Materials List Record - Maintain a current listing of all VOC-containing materials in use at their facility. This listing shall include:

(a) material name and manufacturer identification;

(b) application method;

(c) material type and specific use instructions;

(d) specific mixing ratio;

(e) maximum VOC content as applied (including thinning solvents).

(2) Technical Information Records - Current coating manufacturer specification sheets, Material Safety Data Sheets (MSDS) or current air quality data sheets, which list the VOC content of each material in use at their facility, shall be available for review on site.

(3) Purchase Records - Maintain purchase records identifying the type or name and the volume of material purchased for each VOC-containing material.

(4) Materials Usage Records

(a) If the facility uses exclusively coatings formulations compliant with Section (C), records may be maintained on a monthly basis.

(b) Maintain on a daily basis a record of the volume, VOC content, and resulting VOC emissions of each VOC-containing material used. These records shall be summarized cumulatively on a monthly basis and for each calendar year.

(c) Monthly volume-weighted averaging for non-compliant primer or topcoat or maskant coatings:

(i) Averaging shall be within the coating class only. Averaging primers with topcoats, primers with maskants, or topcoats with maksants is prohibited under this subsection.

(ii) Averaging is permitted for uncontrolled coatings only, subject to requirements of (E)(4)(c)(i) and (E)(4)(c)(ii). (Uncontrolled means when no control device is used to reduce emissions of VOCs from the operation).

(iii) Averaging may be on a process line or facility-wide basis and is subject to record keeping requirements of (E)(4)(b).

(iv) Each averaging scheme shall be approved by the APCO prior to commencing operations and be included as a permit condition on the operating permit for the facility.

(v) Calculations shall follow the formula in definition (B)(49) and procedures per (E)(4)(c).

(5) Add-on Emissions Control Equipment Records - Operators of facilities that use non-compliant coating materials with compliance achieved through the operation of add-on emission control equipment shall:

(a) maintain daily records of key operating and maintenance procedures.

(b) utilize Compliance Assurance Monitoring, as approved by the APCO, to meet administrative and equipment operational requirements.

(c) If a control device is used, each owner/operator shall conduct an initial performance test to demonstrate compliance with the overall reduction efficiency specified in Subsection (C)(1))(d)(i). For carbon adsorber systems, the initial performance test shall be used to establish the appropriate rolling average material balance period for determining compliance.

(6) Records Availability and Retention - All records required by this rule shall be retained for the previous five year period and be available for inspection upon request by the APCO or their designated representative.

(F) Test Methods

(1) The VOC content of a coating, solvent or stripper shall be determined using EPA Reference Method 24, its constituent methods or an equivalent method approved by the District APCO, ARB and EPA. The determination of exempt compounds shall be performed in accordance with ASTM D 4457-85.

(2) Compliance with Section (C)(1)(d) shall be determined by using ARB Method 100 or EPA Method 25 or a method determined to be equivalent and approved by the APCO, ARB, and EPA.

(3) Compliance with Section (C)(1)(d) shall be based on EPA Guidelines for Developing Capture Efficiency Protocols from 55 FR 26865, June 29, 1990; or

EPA technical guideline document "Guidelines for Determining Capture Efficiency" as finalized 1/9/95; or

EPA technical guidance document "Revised Capture Efficiency Guidance for Control of Volatile Organic Compound Emissions" as finalized 2/7/95; or

EPA Source Test Method 204 and variations A, B. C, D, E, and F as revised 8/1/95.

(4) MDAQMD recommends that Transfer Efficiency for Alternative Application Techniques (compliance with Section (C)(2)) be determined using South Coast Air Quality Management District Method "Spray Equipment Transfer Efficiency Test Procedure of Equipment User", May 24, 1989.

(5) Compliance with Section (C)(1) shall be determined using ASTM D 2879-86, manufacturer's specified vapor pressure, or an accepted scientific reference.

(6) Compliance with Section (B)(31), percent acid, shall be determined using ASTM method D-1613-85.

[SIP: Approved: 8/17/98, 63 FR 43884, 40 CFR 52.220(c)(242)(I)(A)(1)]